DOCUMENT RESUME

ED 228 964 HE 016 134

AUTHOR Annis, Linda Ferrill
TITLE The Processes and Effects of Peer Tutoring.
PUB DATE Apr 83
NOTE 11p.; Paper presented at the Annual Meeting of the American Educational Research Association (Montreal, Canada, April 1983).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; *College Students; Educational Research; Higher Education; *Learning Theories; *Peer Teaching; *Tutoring

ABSTRACT

The classroom effects of five peer tutoring situations were compared with 130 female sophomores enrolled in a history course at a midwestern university. Students read a 1525-word article and were assigned to one of the following conditions: reading an assignment to take a test, reading as if the material were going to be taught to a tutee but not actually teaching, reading in preparation for teaching the materials followed by actually teaching a tutee, being taught the material by a tutor, and reading the material followed by being taught by a tutor. Students were then administered Bloom's Taxonomy to determine the effects of various aspects of tutoring and being tutored on content-specific and generalized cognitive gains. Results indicated that tutoring compared to being tutored resulted in significantly greater gains in content-specific and cognitive scores. In addition, students who prepared to teach and then taught generally scored higher than students who prepared only, indicating the importance of the actual teaching process for learning. The findings are discussed in terms of a three-step model of verbal learning that involves paying attention to the material that is to be learned, encoding it in a personally meaningful way, and associating it with what is already known. (SW)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

ED228964

# The Processes and Effects of Peer Tutoring

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Linda F. Annis

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

Linda Ferrill Annis
Educational Psychology Department
Ball State University
Muncie, Indiana 47306

Paper presented at the Annual Meetings of the American Educational Research Association, Montreal, Canada, April, 1983.

HE 016 136



PRINTED IN U.S.A.

A common saying is that the best way to learn something is to teach it. However there is surprisingly little empirical data on the cognitive benefits of teaching, and more specifically on the kind of teaching called peer tutoring where one student acts as the tutor and another student as the tutee. The peer tutoring studies which do exist appear to agree in finding achievement gains for both the tutor and tutee (e.g., Devin-Sheehan, Feldman, & Allen, 1976). But there is disagreement as to whether peer tutoring is more beneficial for tutor or tutee.

One possible reason for these inconsistent results is that there has been little investigation of why achievement gains appear to result from peer tutoring. In order to explain these conflicting results, it is necessary to look more closely into the actual processes involved in peer tutoring for both the tutor and tutee. Bargh and Schul (1980) provided one of the first attempts to look more closely at the details of this relationship especially from the point of view of the tutor. They theorized that the tutor benefits from the teaching process in two ways. First, teaching can cause a "content-specific" gain by increasing the organization and elaboration of the specific material that was taught. In addition, tutoring can facilitate the learning of related material, which is knows as a "generalized" gain. Bargh and Schul compared students who studied material to learn it themselves with students who studied the material with the expectation they were to teach it to someone else even though they did not actually teach at a later time. They found that the students who were expecting to teach had significantly higher content-specific scores. Thus they tentatively concluded that cognitive benefits of teaching do result from the preparation stage of the teaching process.

Their study does offer some interesting initial insights into the process of peer tutoring, but many questions remain to be answered. First, as Bargh and Schul themselves point out, the laboratory simulation of reading the material only

and studying it with the expectation of teaching was not very realistic. In actual classroom situations reading and preparing to teach lasts longer than the short time of their study. Second, the relative importance of the preparation stage of teaching versus the actual teaching and interacting with the tutee stage were never directly compared in the same experiment. In addition, the preparation and actual teaching stages of tutoring versus being tutored were never separated and compared for their effects on content-specific and generalized cognitive gains.

A more recent study (Annis, 1982) further investigated the process of peer tutoring using a classroom rather than laboratory setting. Students were asked to read an article under control, tutoring, or tutee conditions and were later tested for both content-specific and generalized cognitive gains. Results indicated that tutoring resulted in significantly greater learning than being tutored. It was also found that the effects of tutoring were greater for content-specific than for generalized cognitive learning.

The purpose of the present study was to further investigate the process of peer tutoring utilizing the following characteristics which were not all present in the previous studies: reading materials appropriate for the actual courses used, all possible realistic treatment combinations of tutoring and being tutored, amount of treatment time controlled for all conditions, delayed rather than immediate measure of treatment effect, and control for initial differences in reading ability. More specifically, it compared the effects of five combinations of tutoring or being tutored (reading an assignment to take a test, reading as if the material were going to be taught to a tutee but not actually teaching, reading in preparation for teaching the materials followed by actually teaching a tutee, being taught the material by a tutor, and reading the material followed by being taught by a tutor) on student achievement as measured by questions at the six

levels of Bloom's Taxonomy (1956). This was done in order to determine the relative effects of various aspects of tutoring and being tutored on content-specific and generalized cognitive gains. It was assumed that the question at the lower levels of Bloom's Taxonomy measured content-specific gains while the questions at the higher levels measured more generalized achievement.

Subjects were 130 female sophomores enrolled in a history course at a mid-western university. On the first day of study, all students except the Taught group received a copy of a 1525-word history article and then were randomly assigned in equal groups of 24 to one of five treatment conditions. One group was asked to read the article only (Read). The second group was asked to read the article in order to prepare themselves to teach its contents to another student without being able to refer back to the article, but they did not actually teach after they prepared (Read to Teach). Thus these students utilized only the preparation effect of tutoring. The third group was asked to read the article in preparation for teaching it to another student without referring back to the article, and then to actually teach the contents of the article to a tutee (Read and Teach). These students utilized both the preparation and actual teaching stages of tutoring. The fourth group were taught about the article by a separate group of tutors (Taught). These tutors studied the article earlier but were not tested later or considered one of the treatments since their total treatment time, as described later, exceeded the time allowed the other five conditions. The fifth group read the article and then were assigned to a tutor from the Read and Teach group who went over the material with them (Read and Taught). All subjects were asked not to take notes or to mark the article, and were told they would be asked to answer questions on the article at a later time.

During the first 15 minutes of the 30-minute research period, all students except the Taught group read the assigned article. After 15 minutes, the Read and

Teach students were randomly assigned to tutor the students in the Read and Taught condition for the remaining 15 minutes. The tutees were encouraged to ask questions and to interact with their tutor. The Read and the Read to Teach students continued to read during the second 15 minutes. The Taught students spent the entire 30 minutes in a tutoring session with a group of randomly assigned tutors who had spent the previous 15 minutes reading the article in preparation to teach. However these tutors for the Taught group were not later tested on the article since their total 45 minutes of treatment (15 minutes preparation and 30 minutes of tutoring) exceeded the 30 minutes of treatment held constant for the five main treatment conditions. All students were able to complete their assigned treatment during the total allotted treatment time of 30 minutes.

One week later an examination consisting of 48 possible points was given. There were eight multiple-choice questions worth one point each at the Knowledge, Comprehension, Application, and Analysis levels of Bloom, and four essay questions worth two points each at both the Synthesis and Evaluation levels.

Thus the independent variable was treatment (Read, Read to Teach, Read and Teach, Taught, Read and Taught). Six dependent variables were used: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation scores. The raw score on the Comprehension section of the Nelson-Denny Reading Test was obtained from university records for each subject and used as a covariate for initial differences in reading ability.

An equal-cell, one-way multivariate analysis of covariance was performed on the data for the 130 subjects. This analysis indicated a significant main effect for treatment ($\underline{F}$ (24, 416) = 2.51, $\underline{p} < .001$). Separate univariate analyses were conducted for each of the six dependent variables. The univariate analysis for Knowledge indicated a significant effect for treatment ($\underline{F}$ (4, 124) = 3.10, $\underline{p} < .05$). The mean Knowledge scores were 3.35 for Taught, 4.0 for Read, 4.81 for Read to

Teach, 5.08 for Read and Taught, and 6.31 for Read and Teach. A post hoc Newman - Keuls test indicated that the students who Read and Teach scored significantly higher ($p < .05$) than the subjects in the other four conditions. In addition, the Read and Taught students scored significantly higher ($p < .05$) than students who were Taught and who Read, and the Read to Teach students scored significantly higher ($p < .05$) than students who were Taught.

The univariate analysis for Application indicated there was a significant effect for treatment ($F$ (4, 124) = 3.62, $p < .01$). The mean scores were 2.62 for Taught, 2.84 for Read, 3.73 for Read and Taught, 4.0 for Read to Teach, and 4.65 for Read and Teach. A post hoc Newman-Keuls test revealed that both the Read and Teach and the Read to Teach students scored significantly higher ($p < .05$) than both the Taught and the Read conditions, and that Read and Taught students scored significantly better ($p < .05$) than those who were Taught only.

The univariate analysis for Analysis scores also indicated a significant effect for treatment ($F$ (4, 124) = 2.46, $p < .05$). The mean Analysis scores were 3.35 for Taught, 4.08 for Read, 4.31 for Read to Teach, 4.42 for Read and Taught, and 5.77 for Read and Teach. A post hoc Newman-Keuls test revealed that the only significant difference ($p < .05$) was that Read and Teach students scored higher than students in the other four conditions.

Finally, there was a significant univariate analysis for Synthesis scores ($F$ (4, 124) = 5.97, $p < .001$). The mean scores were 1.23 for Taught, 1.65 for Read to Teach, 1.81 for Read, 2.81 for Read and Teach, and 3.65 for Read and Taught. A post hoc Newman-Keuls test revealed that the Read and Taught students scored significantly higher ($p < .05$) than the students in all other treatments. In addition, the Read and Teach students scored significantly higher ($p < .05$) than the Taught, Read to Teach, and Read students.

In all cases of significant results for treatment, the students who were Taught only scored lower than the students in the two teaching conditions. Despite the previous conflict in the literature as to whether peer tutoring is more beneficial for tutor or tutee, the results of this actual classroom study agree with the earlier Annis study (1982) in indicating a definite advantage for the tutor. The significant univariate analyses of treatment for the four dependent variables of Knowledge, Application, Analysis, and Synthesis may offer some insight into why peer tutoring was more effective for tutors than tutees. Tutees apparently acquire less of the content-specific material that was taught as measured by Knowledge as well as less of the more generalized, related material as measured by Application, Analysis, and Synthesis. The results also provide support for the Bargh and Schul (1980) finding that cognitive benefits of teaching result from the preparation stage of teaching in itself. Students who Read to Teach scored higher than students who Read only in both the content-specific gains measured by Knowledge found by Bargh and Schul, and also in the more generalized achievement measured by Application and Analysis.

In addition, the study provides interesting insights into the relative benefits of the preparation stages of tutoring. In every case of significant effect for treatment at both generalized and content-specific levels, students who were able to both Read and Teach scored higher than students who Read to Teach even though treatment times were held constant. It thus appears that there is a definite advantage for learning both specific and generalized material resulting from the actual presentation of material to the tutee and interacting with them. The students who Read the material to learn it on their own generally only scored better than the students who were Taught indicating again that it is more effective to be actively engaged in teaching than to be the more passive recipient of being taught or of reading on their own.

A possible explanation for these results lies in a three-step theory of verbal learning that involves paying attention to the material that is to be learned, encoding it in a personally meaningful way, and associating it with what is already known. It may be that the students who were Taught and thus who were not able to read the material on their own were handicapped in all three aspects of verbal learning. Thus they exhibited deficits in both specific and generalized learning as compared to students in the other four conditions. However the students who Read to Teach were more motivated to pay attention to the material and encode it in a meaningful way since they believed they were faced with the immediate prospect of teaching the material. Thus they generally scored better on both specific and generalized learning than the Read students who were less motivated by the demands of a more distant test. However the most effective learners at both the specific and generalized levels basically were the students who Read and Teach possibly because it was only in this treatment group that their actual interaction with their tutees encouraged them in associating the material to what they already knew. Thus the Read and Teach students may have generally learned the most because the demands of their treatment required them to perform all three of the steps essential to learning.

The results of this study suggest it is definitely better to be the tutor than the tutee. Cognitive benefits of tutoring appear to arise from the mere preparation to teach, but it is even more effective to follow the preparation with actually presenting the material to the tutee and interacting with them. Peer tutoring thus appears to be a potentially powerful technique for increasing all levels of student learning.

## References

Annis, L. F. The cognitive benefits of peer tutoring. Paper presented at the Annual Meetings of American Educational Research Association, New York City, March, 1982.

Bargh, J. A., & Schul, Y. On the cognitive benefits of teaching. Journal of Educational Psychology, 1980, 72, 593-604.

Devin-Sheehan, L., Feldman, R. S., & Allen, V. L. Research on children tutoring children: A critical review. Review of Educational Research, 1976, 46, 355-385.

The Processes and Effects of Peer Tutoring

College students read a 1525-word article under control, tutoring, or tutee conditions (read only, read to teach but not actually teach, read and actually teach, taught only, or read and were taught) in order to determine the realistic classroom effects of tutoring or being tutored. Results indicated that tutoring resulted in significantly greater both content-specific and generalized cognitive gains than being tutored. It was also found that students who prepared to teach and then taught generally scored higher than students who prepared only indicating the importance of the actual teaching process for learning. The findings are discussed in terms of a three-step model of verbal learning.